What is claimed is:

1. An apparatus for detecting arrival time for a packet including a preamble, the apparatus comprising:

a receiver for receiving and demodulating a signal; and

a packet arrival time detector, coupled to the receiver, configured to correlate the demodulated received signal with a stored preamble and to output a packet arrival time at a symbol period boundary of the received signal.

2. The apparatus of claim 1, wherein the packet arrival time is used to adjust a variable sample delay of the demodulated received signal.

3. The apparatus of claim 1, wherein the packet arrival time detector includes

a correlator configured to correlate real and imaginary components of the demodulated received signal with real and imaginary components of the stored preamble to produce a real correlator output and an imaginary correlator output,

a first low pass filter configured to filter the real correlator output;

a second low pass filter configured to filter the imaginary correlator output;

a first squaring device configured to square the filtered real correlator output;

a second squaring device configured to square the filtered imaginary correlator output;

an adder configured to sum the squared filtered real correlator output with the squared filtered imaginary correlator output to produce a correlated output, and

a peak detector configured to detect a maximum value of the correlated output during a window of period W and to compare an index of the maximum value of the correlated output with a modulo-L counter value to produce the packet arrival time.

4. The apparatus of claim 3, wherein the correlator quantizes the real and imaginary components of the demodulated received signal to one bit.

5. The apparatus of claim 4, wherein the correlator quantizes the real and imaginary components of the demodulated received signal to one bit by selecting a sign bit of the real and imaginary components of the demodulated received signal.

6. The apparatus of claim 4, wherein the correlator multiplies the quantized real and imaginary components of the demodulated received signal with quantized real and imaginary components of the stored preamble using one-bit multipliers.

7. The apparatus of claim 6, wherein the one-bit multipliers are implemented as 2-bit comparators.

8. The apparatus of claim 3, wherein the correlator includes a shift register having NL locations, where N is the number of symbols in the preamble and L is a ratio of the sampling rate of the receiver to the symbol rate of the receiver.

9. The apparatus of claim 3, wherein the correlator includes two groups of N multipliers, where N is the number of symbols in the preamble.

10. The apparatus of claim 3, wherein the peak detector includes

a threshold detector configured to compare the correlated output with a predetermined threshold and to output an enable signal when the correlated output exceeds the predetermined threshold,

a memory configured to store the correlated output when enabled by the enable signal from the threshold detector, and

a maximum index locator to locate the index of the maximum value of the correlated output stored in the memory.

11. The apparatus of claim 1, wherein the packet arrival time detector outputs the packet arrival time to an equalizer.

12. The apparatus of claim 1, wherein a sampling frequency of the receiver is chosen such that every other sample of a real component of the demodulated received signal is zero and every other sample of an imaginary component of the demodulated received signal is zero, where the real component of the demodulated received signal is skewed one sample from the imaginary component of the demodulated received signal.

13. A method for detecting arrival time of a packet including a preamble, the method comprising the steps of:

receiving and demodulating a signal;

correlating the demodulated received signal with a stored preamble to produce a correlated output;

detecting a maximum of the correlated output during a window of period W; and

comparing an index of the maximum with the output of a modulo-L counter to produce a packet arrival time at a symbol period boundary of the received signal.

14. The method of claim 13, further comprising the step of using the packet arrival time to adjust a variable sample delay of the demodulated received signal.

15. The method of claim 13, wherein the step of correlating includes correlating real and imaginary components of the demodulated received signal with real and imaginary components of the stored preamble to produce a real correlator output and an imaginary correlator output, and summing the real correlator output with the imaginary correlator output to produce the correlated output.

16. The method of claim 15, wherein the real correlator output and the imaginary correlator output are low pass filtered and squared prior to being summed.

17. The method of claim 15, wherein the step of correlating includes quantizing the real and imaginary components of the demodulated received signal to one bit.

18. The method of claim 17, wherein quantizing the real and imaginary components of the demodulated received signal includes selecting a sign bit of the real and imaginary components of the demodulated received signal.

19. The method of claim 17, wherein the step of correlating includes multiplying the quantized real and imaginary components of the demodulated real and imaginary components with quantized real and imaginary components of the stored preamble using one-bit multipliers.

20. The method of claim 19, wherein the one-bit multipliers are implemented as 2-bit comparators.

21. The method of claim 13, wherein a sampling frequency of the received demodulated signal is chosen such that every other sample of a real component of the received demodulated signal is zero and every other sample of an imaginary component of the received demodulated signal is zero, where the real component of the received demodulated signal is skewed one sample from the imaginary component of the received demodulated signal.

22. A system for detecting arrival time of a packet including a preamble, comprising:

means for receiving and demodulating a signal;

means for correlating the demodulated received signal with a stored preamble to produce a correlated output;

means for detecting a maximum of the correlated output during a window of period W; and

means for comparing an index of the maximum with the output of a modulo-L counter to produce a packet arrival time at a symbol period boundary of the received signal.